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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,084	12/06/2000	Jon A. Arrowood	8999	9387

26890 7590 08/15/2003

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EXAMINER

PATEL, KINARI M

ART UNIT	PAPER NUMBER
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2654

DATE MAILED: 08/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/731,084

Applicant(s)

ARROWOOD ET AL.

Examiner

Kinari Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informalities: typographical error.

On Page 11, Line 24, reference "310" should read "510".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Van Schyndel (US Patent No. 5,940,118).

As per claim 1, Martino et al. discloses an apparatus comprising:

- a) a self-service kiosk which dispenses articles, currency, or communication services (Col. 1, Ln. 41-60, FIG. 2). Martino et al. fails to disclose b) within the kiosk, a steerable-beam

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microphone array which points a microphone lobe toward the face of the customer, for receiving speech from the customer.

One with ordinary skill in the art at the time of invention would readily know a steerable-beam microphone array which points toward the face of the customer for receiving speech from a customer, as taught by Van Schyndel. Van Schyndel optical information to optimally steer a microphone array in the direction of a talker (Col. 2, Ln. 55-58). Van Schyndel also teaches video cameras which are coupled to a microphone array control device which in turn is coupled to a steerable microphone system, such as a microphone array (Col. 4, Ln. 20-23, FIG. 1, 30, 40, 60). Van Schynel further teaches a determination of whether a captured image is a head, and "head matching" where the image is compared to a library of images for the purposes of recognition and identification (Col. 5, Ln. 50-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. wherein within the kiosk, a steerable-beam microphone array which points a microphone lobe toward the face of the customer, for receiving from the customer because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 2, Martino et al. as modified by Van Schnydel discloses all the limitations of a system according to claim 1. Martino et al. further discloses the system of claim 1 further comprising a speech recognition apparatus for recognizing speech (Col. 2, Ln. 21-29).

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4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Nagata (US Patent No. 6,009,396).

As per claim 3, Martino et al. discloses an apparatus comprising:

a) a self-service kiosk which dispenses articles, currency, or communication services

(Col. 1, Ln. 41-60, FIG. 2). Martino et al. fails to disclose:

b) within the kiosk,

i) a steerable beam microphone array, having multiple lobes;

ii) means for sampling lobes, and

A) identifying lobes having a relatively high speech content,

B) identifying lobes having a relatively low noise content, and

C) actuating a lobe having both a relatively high speech content and relatively low noise content.

One with ordinary skill in the art at the time of invention would readily know the aforementioned features, as taught by Nagata. Nagata teaches a speech recognition system using a microphone array (Col. 1, Ln. 37-44, FIG. 1). Nagata further teaches a sound source position search unit that estimates a power arriving from each position (Col. 6, Ln. 1-2 and Ln. 42-47; Col. 9, Ln. 29-35; FIG. 3, 3, FIG. 6). The sound source position search unit is the equivalent of ii) means for sampling lobes, since as described in the specification, a lobe is a plot of magnitude versus angular position.

Furthermore, Nagata discloses that all peaks above a threshold are detected as sound sources (Col. 10, Ln. 4-5). This is the equivalent of identifying lobes having a relatively low

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noise content. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). This is equivalent to identifying lobes having a relatively high speech content. Moreover, it is obvious to actuate a lobe having both a relatively high speech content and relatively low noise content since one in the art would obvious like to put the prior signal processing to use in a meaningful way.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. to further include within a kiosk a steerable beam microphone array, having multiple lobes; ii) means for sampling lobes, and A) identifying lobes having a relatively high speech content, B) identifying lobes having a relatively low noise content, and C) actuating a lobe having both a relatively high speech content and relatively low noise content because one with ordinary skill in the art would recognize that this would serve the purpose of strategically placing the microphone for more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 4, Martino et al. as modified by Nagata discloses all the limitations of the apparatus according to claim 3. Martino et al. fails to disclose the apparatus of claim 3 further comprising: c) speech recognition means for recognizing speech contained in the lobe actuated. One of ordinary skill in the art at the time of the invention would readily know speech recognition means for recognizing speech contained in the lobe actuated, as taught by Nagata. Nagata teaches the band-pass power of the sound source obtained sent from the speech parameter

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extraction unit to the speech recognition unit and used in the speech recognition processing (Col. 10, Ln. 24-31, FIG. 7). A lobe that has the potential to be actuated would be from the sound source, and it is obvious to recognize speech contained in the lobe actuated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Martino et al. to further comprise a speech recognition means for recognizing speech contained in the lobe actuated to process only that part of the signal with high speech content and low noise content for greater speech recognition capability.

5. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martino et al (US Patent No. 6,061,646) in view of Van Schnydel (US Patent No. 5,940,118) and Nagata (US Patent No. 6,009,396).

As per claim 5, Martino et al discloses a method, comprising the following steps:

a) maintaining a self-service kiosk which dispenses articles, currency, or communication services (Col. 1, Ln. 41-60, FIG. 2).

Martino et al. fails to disclose:

- b) maintaining a beam-steerable microphone array at the self-service kiosk;
- c) measuring noise content and speech content of several lobes of the array; and
- d) selecting a lobe which carries
  - i) larger speech signals than other lobes and
  - ii) smaller noise signals than other lobes.

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One of ordinary skill in the art at the time of the invention would readily know maintaining a beam-steerable microphone array, as taught by Van Schnydel. Van Schnydel teaches a microphone array which uses optical information to optimally steer a microphone array in the direction of a talker (Col. 2, Ln. 56-58).

Furthermore, one of ordinary skill in the art at the time of the invention would also readily know c) measuring noise content and speech content of several lobes of the array; and d) selecting a lobe which carries i) larger speech signals than other lobes and ii) smaller noise signals than other lobes, as taught by Nagata. Nagata teaches a speech recognition system using a microphone array (Col. 1, Ln. 37-44, FIG. 1). Furthermore, Nagata discloses that all peaks on the sound source distribution above a threshold are detected as sound sources (Col. 10, Ln. 4-5). It is obvious to measure noise content of several lobes of the array since Nagata already distinguishes noise from sound in the signal coming from the microphone array. Moreover, Nagata discloses a speech parameter extraction unit extracts the power for each bandwidth and uses it as a speech parameter. This speech parameter is sent to the speech recognition unit (Col. 10, Ln. 24-27, FIG. 3). In the speech recognition unit, the speech power is calculated from the speech parameter (Col. 10, Ln. 32-33). It is obvious to measure speech content of several lobes in the array since Nagata already measure speech content of the signal coming from the microphone array. Moreover, it is obvious to select a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes since one in the art would obviously put the prior signal processing to use in a meaningful way in order to enhance speech recognition capabilities.



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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Martino et al. to further comprise maintaining a beam-steerable microphone array at the self-service kiosk, measuring noise content and speech content of several lobes of the array, and selecting a lobe which carries larger speech signals than other lobes and smaller noise signals than other lobes because one of ordinary skill in the art would recognize that this would provide more accurate speech recognition for suppressing background noise and localizing sound sources effectively.

As per claim 6, Martino et al. as modified by Van Schnydel and Nagata discloses all the limitations of a method according to claim 5. Martino et al. fails to disclose the method of claim 5 further comprising the step of e) receiving signals from the lobe selected, and performing speech recognition on the data. One of ordinary skill in the art at the time of the invention would readily know to receive signals from the lobe selected, and perform speech recognition on the data. Nagata discloses a speech recognition unit whereby speech power is calculated from the speech parameter extracted by the speech parameter extraction unit, and a speech section detected by a speech detection unit according to the speech power. Then a pattern matching unit carries out pattern matching with a recognition dictionary so that speech recognition is realized (Col. 10, Ln. 32-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Martino et al. to further comprise the step of receiving signals from the lobe selected, and performing speech recognition on the data because one of ordinary skill in the art would readily recognize that this would allow speech recognition on a select part of the signal where speech is most likely carried, as opposed to noise.

*Conclusion*

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent No. 5,574,824 to Slyh with respect to microphone array speech enhancers

US Patent No. 4,845,636 to Walker with respect to remote transaction systems

US Patent No. 5,737,485 to Fanagan with respect to microphone arrays and speech recognition

US Patent No. 4,653,102 to Hansen with respect to directional microphone systems

US Patent No. 6,363,345 to Marash with respect to canceling noise

US Patent No. 5,400,409 to Linhard with respect to noise reduction

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kinari Patel whose telephone number is 703-305-8487. The examiner can normally be reached on 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 703-305-9645. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

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August 11, 2003

*Vijay Chawan 8/11/03*

**VIJAY CHAWAN  
PRIMARY EXAMINER**